

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning documents *will not* correct images,  
please do not report the images to the  
Image Problem Mailbox.**

REMARKS

This application has been amended in a manner that is believed to place it in condition for allowance at the time of the next Official Action.

Claims 22-40 are pending in the present application. Claims 1-21 have been canceled. Support for new claims 22-40 may be found in the previously pending claims 1-21 and generally throughout the specification.

In the outstanding Official Action, claims 1 and 4-8 were rejected for reciting multiple periods within each claim. The Official Action alleged that the multiple periods were confusing. Claims 1 and 4-8 have been canceled. Applicants believe that claims 22-40 have been drafted in a manner so that these informalities no longer appear in the claims.

Claims 1-19 were rejected under 35 USC 101 for allegedly being directed to non-statutory subject matter. This rejection is respectfully traversed.

In imposing the rejection, the Official Action alleged that the claimed method did not provide an immediate, concrete, tangible, and useful result. However, claims 1-19 have been canceled. Applicants believe that claims 22-40 satisfy the requirements of 35 USC 101. In particular, the Examiner's attention is respectfully directed to independent claim 22. Claim 22 recites a step of actually mapping the location of a

gene in part iii) of the claim. Thus, it is believed that claim 22 provides an immediate, concrete, tangible, and useful result. As claim 22 is the sole independent claim, applicants believe that claims 22-40 satisfy the requirements of 35 USC 101.

In the outstanding Official Action, claims 1-21 were rejected under 35 USC 112, second paragraph, as allegedly being indefinite. Applicants believe that the present amendment obviates this rejection.

The Official Action alleged that claims 1-21 were indefinite for failing to recite active method steps. While claims 1-21 have been canceled, claims 22-40 have been drafted in a manner so that the claims recite positive method steps. Thus, applicants believe that the present amendment obviates this contention.

In the outstanding Official Action, the claims were rejected for reciting the term "which are polymorphic nucleic acid or protein sequences or strings of single nucleotide polymorphisms deriving from a chromosomal region". However, the claims have been drafted so that this phrase no longer appears in the claims. As a result, it is believed that this issue has been resolved.

The outstanding Official Action also rejected the claims for reciting the terms "chromosome and phenotype data", "utilizes", "linkage disequilibrium", "all marker patterns",

"linked", and "involved". Upon reviewing claims 22-40 and the present specification, applicants believe that these terms are definite to one of ordinary skill in the art. The Examiner's attention is respectfully directed to page 5, line 3, wherein the present specification provides a description of these terms. Indeed, the detailed description continues all the way to page 7.

The outstanding Official Action also rejected claim 1 for reciting the term "based". The Official Action alleged that the term was indefinite and it was unclear as to what was being maximized or minimized. However, as noted above, claims 1-21 have been canceled and new claims 22-40 have been added. In independent claim 22, step iii) clearly recites a step for mapping a location of a gene by evaluating the scores  $s(m_i)$  of all the markers  $m_i$  in the data which is determined by maximizing the score if the scoring function is designed to give higher scores closer to the gene, and on minimizing the score if the scoring function is designed to give lower scores closer to the gene. Thus, the term is no longer recited in the claims. Moreover, it is believed that the claims are definite to one of ordinary skill in the art.

Claim 1 was also rejected for reciting the term "as is the case for instance". This term no longer appears in the claims. As a result, it is believed that this rejection has been obviated.

In the outstanding Official Action, claim 3 was rejected for reciting the term "wherein the haplotypes and genotypes referred to in the marker patterns". However, as noted above, claim 3 has been canceled. The subject matter of claim 3 now appears in claim 24. Claim 24 is directed to a method wherein the haplotypes and genotypes contain flexible regions. Applicants believe that this recitation is clear to one of ordinary skill in the art.

Claims 4-8 were rejected for reciting computer code. In imposing the present rejection, the Official Action alleged that the computer code was indefinite. New claims 22-40 do include computer code. However, applicants believe that claims 22-40 have been drafted in a manner so that the code represents a "sufficiently high-level language and descriptive identifiers" that one of ordinary skill in the art would find the claims definite.

Claims 4-8 were further rejected for reciting a numbering system which allegedly rendered the claims indefinite. However, claims 22-40 have been drafted so that this term no longer appears in the claims. Thus, it is believed that the claims are definite to one of ordinary skill in the art.

As to claims 9-11, the Official Action rejected the claims for reciting the phrase "such as". However, applicants

believe that the present amendment obviates this rejection. This term is no longer recited in the claims.

Claims 9 and 10 were also rejected for reciting the term "sufficiently reliable". Claims 22-40 have been drafted in a manner so that this term is not recited. As a result, it is believed that this rejection has been rendered moot.

The outstanding Official Action also rejected claims 9 and 10 for reciting the term "large enough". However, this phrase is no longer recited in the claims. Thus, it is believed that claims 9 and 10 are definite to one of ordinary skill in the art.

The Official Action also rejected claims 9 and 10 because it was allegedly unclear whether the recitations of claims 9 and 10 further limited the independent claim. The subject matter of previously pending claims 9 and 10 may be found in new claims 30 and 31, respectively. Claims 30 and 31 have been drafted so that they recite embodiments relating to the pattern evaluation function in the score of the claimed invention. As a result, it is believed that claims 30 and 31 further modify claim 22.

As to claim 11, claim 11 was rejected for reciting the term "p value". The Official Action alleged that the term "p value" was found in at least three different places in the claims and that it was unclear how this term modified the claimed

invention. While claim 11 has been canceled, the subject matter of claim 11 now appears in claim 32. Applicants believe that claim 32 further limits claim 31 by further defining the linear model. Thus, it is believed that claim 32 is definite to one of ordinary skill in the art.

Claim 12 is rejected because it was allegedly unclear as to whether a step should be placed in the method claim of the previously pending claim 1. Applicants believe that the claim is directed to the score refined immediately after being calculated. The subject matter of claim 12 now appears in claim 33, claim 33 is believed to be definite to one of ordinary skill in the art.

Claim 13 was rejected for reciting the term " $p(m_i)$ ". However, claim 13 has been canceled.

In claim 14, the phrase "the area returned from the prediction of the gene location" was rejected for lacking antecedent basis. The subject matter of claim 14 may be found in claim 34. Claim 34 recites the method according to claim 22, wherein an area returned from the prediction of the gene location is contiguous, fragmented, or a point. As a result, it is believed that claim 34 is definite to one of ordinary skill in the art.

Claim 15 was rejected for not clearly limiting claim 1. However, claim 15 has been canceled. Thus, it is believed that this rejection has been rendered moot.

Claim 16 was rejected for allegedly being a run-on sentence. However, claim 16 has been redrafted as claim 35. It is believed that claim 35 has been drafted in a manner so as to overcome this formality.

The term "sufficiently large" in claim 17 was objected to as being indefinite. As to claim 17, this term is no longer recited in the claims.

In claim 18, the terms "expert investigation" and "expert" were rejected for allegedly being indefinite. The Official Action alleged that the term "expert" was not defined by the claim, the specification, and that one of ordinary skill in the art would not be reasonably be apprised of the scope of this term. Claims 22-40 have been drafted so that these phrases are not recited. It is believed that the present amendment obviates this rejection.

The Official Action rejected claim 19 as allegedly being unclear as to how the recitation of claim 19 would be carried out. The subject matter of claim 19 is now recited in claim 38. Claim 38 recites the method of claim 22, further comprising searching for multiple genes by evaluating marker patterns that refer to several potential gene loci at the same time. Thus, it is believed that claim 38 is definite to one of ordinary skill in the art.



Claim 21 was rejected for reciting elements which do not define a computer system. The Official Action alleged that a computer system is an apparatus and that the method performed by the apparatus does not define its structure. Claim 21 has been canceled.

The subject matter of claim 21 may be found in claim 40. Claim 40 has been drafted to recite a computer system comprising executable program code that performs the method of claim 22. Thus, the computer system includes executable program code. With this in mind, it is believed that the claim is definite to one of ordinary skill in the art.

In the outstanding Official Action, claims 1-21 were rejected under 35 USC 102(a) as allegedly being anticipated by TOIVONEN et al. This rejection is respectfully traversed.

Applicants respectfully submit that the TOIVONEN et al. article fails to qualify as prior art. Indeed, the Examiner's attention is respectfully directed to the enclosed declaration which provides that Mathias Herr is not one of the inventors of the present application. As a result, the article cannot qualify as prior art of "another". Thus, it is believed that the TOIVONEN et al. article fails to anticipate or render obvious the claimed invention.

Claims 1, 2, 20, and 21 were rejected under 35 USC 102(e) as allegedly being anticipated by THREADGILL et al. This rejection is respectfully traversed.

While THREADGILL et al. teach a population for genetic mapping, the method for generating the disclosed population, and methods for using the disclosed population for efficient identification of genetic loci that modulate a phenotype, applicants believe that THREADGILL et al. fail to disclose or suggest the claimed invention.

Indeed, THREADGILL et al. is directed to methods of how to create a certain population with the help of a particular gene mapping technique, and this population is then used to find genetic loci that modulate phenotypes and define gene-environment interactions. In doing so, THREADGILL et al. create a "renewable population". This "renewable population" is constructed from mice or other laboratory animals. The "renewal population" is essential to the method of THREADGILL et al.

However, applicants believe that THREADGILL et al. fail to disclose each and every recitation of the claimed invention. Indeed, THREADGILL et al. fail to disclose or suggest a step of data mining. As a result, applicants believe that THREADGILL et al. cannot anticipate or render obvious the claimed invention.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

YOUNG & THOMPSON



---

Philip A. DuBois, Reg. No. 50,696  
745 South 23<sup>rd</sup> Street  
Arlington, VA 22202  
Telephone (703) 521-2297  
Telefax (703) 685-0573  
(703) 979-4709

PD/fb

**APPENDIX:**

The Appendix includes the following item(s):

- a 37 CFR 1.132 Declaration



PATENTS

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Raimo T.T. TOIVONEN, Päivi OIKARINEN,  
Eero VASKO, Vesa OLLIKAINEN, Petteri  
SEVON, Heikki MANNILA, Juhani KERE

Confirmation No. 8397

Serial No. 09/875,935

GROUP 1631

Filed June 8, 2001

Examiner May K. Roman

A METHOD FOR GENE MAPPING FROM  
CHROMOSOME AND PHENOTYPE DATA

DECLARATION UNDER RULE 132

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

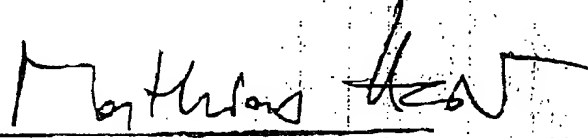
Sir:

I, Mathias HARR, declare that I am a co-author of  
the article "Data Mining Applied to Linkage Disequilibrium  
Mapping" that appears in the American Journal of Human  
Genetics, 57:133-145, 2003.

However, I am not a joint inventor with my co-  
authors, of the subject matter claimed in U.S. Patent  
Application Serial No. 09/875,935, filed June 8, 2001.

All statements made herein of my own knowledge are  
true and that all statements made on information and belief  
are believed to be true, and further that these statements  
were made with the knowledge that willful false statements  
and the like so made are punishable by fine or imprisonment,  
or both, under §1001 of Title 18 of the United States Code  
and that such willful false statements may jeopardize the  
validity of the application or any patent issuing thereon.

Dec. 12, 2003  
Date

  
Signature